On the Electrical Conductivity of the Aqueous Solution of Sodium Oleate

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It may be inferred that the constants, a and b, in the above equation have a close relation with the lengths of ethylene oxide and alkyl chains in solution.

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17. On the Electrical Conductivity of the Aqueous Solution of Sodium Oleate

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It is well known that the aqueous soap solution shows the complicated behaviours, which are caused by the aggregation of soap molecules into micelles in their solution.

In the present work, the aging phenomena of the aqueous solution of sodium oleate were examined by the electrical conductivity method.

Sodium Oleate was dissolved in water by heating and cooled to room temperature, and then the electrical conductivity of the solution was measured. The measurment were carried out at room temperature, 15~27°C, and in the concentration range from 0.01 to 0.1N, masking carbon dioxide in the air. And in a certain case, benzene was solubilized into the solution from 0 to 0.5% in volume percentage.

The electrical conductivity of the solution varied with the lapse of time. And it decreased from an initial value to a minimum during one day, and then increased again to a definite value during the following 2~6 days. And it was ascertained that the rates of these particular changes in the electrical conductivity were accelerated by the presence of carbon dioxide and benzene, and also by raising the temperature and the concentration of the solution.

The former process, i.e. the decrease of the electrical conductivity, is thought to be the micelle formation, and the rate of this process seems to depend on the degree of the hydrolysis of sodium oleate, and on the amount of benzene added.

The latter process, the increase of the electrical conductivity, may be ascribed to NaOH that is produced by the acid soap formation. And the rate of this process is increased by the micelle concentration. Hence it is easily understood that this process means the adsorption of oleic acid to the surface or the interior of the micelle.
